

# GET READY FOR THE MASTER COURSES

In order to prepare for the beginning of the Master, here we provide some useful information of the expected level of the students and recommended reading material. Those subjects not present in this list only need of attendance to the previous courses in the master.

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## 32880 Gravitation (GRA):

Although the Gravitation course of the UAM Master in Theoretical Physics is a self-contained course, previous knowledge of some topics is required and, since this course is taught at the beginning of the course, it is highly recommended to refresh that knowledge and warm up a bit with some reading and calculations. Follow this [link](#) for more detailed information.

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## 32549 Cosmology (COSMO):

Scott Dodelson "Modern Cosmology": [Modern Cosmology: Anisotropies and Inhomogeneities in the Universe](#)

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## 32550 Quantum Field Theory (QFT):

The course is largely self-contained, but we assume familiarity with classical and quantum mechanics and classical electrodynamics at the level of Landau & Lifshitz I, II and III or equivalent (in the case of volume II, we refer here to the first few chapters on fundamentals).

A recommended summer reading is Feynman's popular book "QED, the strange theory of light and matter". There is a Spanish version in Alianza Universidad. Despite being a popular book, it IS VERY GOOD preparatory reading for this course.

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## 32552 Stellar Structure and Evolution (EEE)

R. Kippenhahn & A. Weigert, Stellar Structure and Evolution, 1990, Springer-Verlag, ISBN 3-540-50211-4

M. Salaris & S. Cassisi, Evolution of Stars and Stellar Populations, 2005, John Wiley & Sons, ISBN 0-470-09220-3

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### 32555 Astroparticle Physics (ASP):

"The Early Universe", E. Kolb and M. Turner, 1994.

"Particle Dark Matter: Observations, Models and Searches", G. Bertone, 2005.

Cosmology and Particle Astrophysics, L. Bergström, A. Goobar, 2006.

Very High Energy Cosmic Gamma Radiation, F. A. Aharonian, 2006.

Cosmological Physics, J. A. Peacock, 1998.

Structure formation in the Universe, T. Padmanabhan, 1993.

Lectures on Dark Matter (From production to detection)

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### 32559- Advanced Mathematics (MAV):

Standard courses in Mathematical Methods for Physicists which are included in the Bachelor degree of most Universities. This includes the following topics:

1) Vector spaces and linear algebra. Introduction to Hilbert spaces.

2) Analysis of functions of several real arguments.

3) Complex variable theory. Introduction to functions of complex variable: analyticity, etc

4) Differential equations and partial differential equations.

For specific bibliography consult the "guia docente" of the different subjects appearing in UAM syllabus."

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### 32564 Stars & Planets Formation (FEP):

An introduction to star formation Derek Ward-Thompson & Anthony P. Whitworth, Cambridge University Press 2011.

The formation of stars Steven W. Stahler & Francesco Palla, Wiley-VCH, 2004.

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### 32565 - Observational Techniques in Astrophysics (TOA):

Fundamental Astronomy, Editors: Karttunen, H., Kröger, P., Oja, H., Poutanen, M., Donner, K.J. at 'Chapter 2, Springer Verlag', 2007.

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### 32566 - Computational Astrophysics (ACO):

Press et al. "Numerical Recipes in C": <http://apps.nrbook.com/c/index.html>

Kerningham & Ritchie "The C Programming Language": [https://www.amazon.es/C-Programming-Language-Prentice-Hall-software/dp/0131101633/ref=sr\\_1\\_2?ie=UTF8&qid=1466081726&sr=8-2&keywords=the+c+programming+language](https://www.amazon.es/C-Programming-Language-Prentice-Hall-software/dp/0131101633/ref=sr_1_2?ie=UTF8&qid=1466081726&sr=8-2&keywords=the+c+programming+language)